

Preface for papers presented at AMSALS 2012

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The 4th international symposium on Advanced Macromolecular Systems Across the Length Scales Symposium focused on Smart, Nanostructured Systems for Controlled Molecular Release and Biological Interfaces (AMSALS 2012) took place from 3 to 6 June, 2012 in Siófok, Hungary. The symposium was chaired by G. Julius Vancso (University of Twente, the Netherlands), Béla Pukánszky and András Szilágyi (Budapest University of Technology and Economics, Hungary). The scope of the conference was closely related to a collaborative program “BIOSPONA” funded by the Hungarian National Office for Research and Technology (NKTH), and by the Agency for Science, Technology and Research (A*STAR) of Singapore. This Hungarian Singaporean Bilateral S&T International Co-operation was led by G. Julius Vancso (Singapore), Jian Wei Xu (Singapore) and Béla Pukánszky (Hungary).

The main topics of the conference included (a) advanced surfaces: layer-by-layer and other film forming techniques; molecular interactions on surfaces; surface modification and characterization; (b) polymers and hydrogels for controlled delivery: responsive features (pH-, thermo-, redox- and enzyme-sensitivity); injectable systems; tissue engineering and implants; (c) design of nanoparticles, liposomes; micro-encapsulation and diagnostic labelling; release kinetics and mechanism of molecular payloads; and (d) diverse applications in biomedical, biomimetic systems and technologies; pharmaceutical applications; industrial applications from cosmetics to waste water treatment; multiple uses as solar cells, sensors and optical devices.

The symposium events started with a tutorial day for young researchers. The lectures focused on smart, nanostructured systems in the area of hydrogels and controlled release of molecular payloads and particular attention was addressed to structure-properties correlations. The presentations of acknowledged scientists (Mark Hempenius, Wim Hennink, Irina Savina, Romána Zelkó, János Szebeni, G. Julius Vancso) provided very valuable information on materials science, polymer chemistry, polymer physics, interface and colloid science to about 40 graduate and post graduate students.

The tutorial program was followed by two and a half day of session presentations. The lectures of plenary speakers introduced the most up-to-date directions and possible future research topics. The plenary lecture of Erik Reimhult on „Assembly and actuation of super-paramagnetic nanoparticle membranes for controlled release applications” gave a deep insight into the controlled fabrication of nanostructures and focused on the relationship between the material design and release characteristics of molecular payloads. In his presentation „Stimuli-responsive colloids and their applications in directed self-assembly”, Sergiy Minko showed an extensive overview on self-assembly of nanosized building blocks and a particular focus was drawn to stimuli-responsive behaviour. On the second day, the lecture of Wim Hennink on „Thermosensitive and biodegradable hydrogels for pharmaceutical applications” received a great attention since the audience heard a complete overview of various applications from *in vitro* to *in vivo* level. Piroska Szabó-Révész represented the pharmaceutical field with her lecture on „Polymers in the development of nanocrystals and amorphous nanoparticles of active pharmaceutical ingredients” and showed some new aspects after the presentations of chemists and material scientists. The last day was opened by the plenary lecture of Andreas Lendlein whose application-oriented talk and critical approach impressed the audience.

The main outcomes of the BIOSPONA project were presented in an individual session on the first day. All Hungarian and Singaporean partners presented their recent results.

The 3 keynote lectures and 52 oral presentations also attracted the attention of both the young and experienced researchers. The lectures initiated a number of vivid discussions and hopefully, led to further co-operations or even research projects between scientists from different countries. Poster presentations opened the possibility of valuable, informal discussions between participants. Interaction between young researchers was especially intense during this session with an outstanding number of about 70 presenters. The abstracts of the conference were collected in a book of abstracts [1]. Several papers within the scope of the conference have been already published [2-16].

Additional valuable works are presented in this issue of Periodica Polytechnica Chemical Engineering (PPCE).

The presence of industrial participants improved the scientific value of the event. According to our experiences, participants

gathered very substantial ideas for their future work and travelled home with a pleasant memory of Hungary.

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